



Photovoltaic and thermal solar plants Components and systems

Profile



Renewable Energy Future

The age during which convenient and abundant fossil energy resources were available to build new technologies and to support a sustained energy world transition is short. Renewable energy and methodologies have a clear role in future energy policy. Governments decided to develop aggressive long term actions that can accelerate the widespread applications of renewable energy and to get on a firm path toward a worldwide “renewable energy transition”; according to this policy 20% of world electricity production should come from renewable energy sources within 2020. Renewable energies are potential resources to provide society with efficient and environmental friendly energy. Renewable technologies clearly reduce air pollution and greenhouse gas emission and, in addition, improve the security of energy by diversifying and decentralizing energy supply, reducing the dependence to fossil fuel sources. Besides, renewable energy technologies form a dynamic sector which provides economic growth and jobs for our economies.

Solar Energy

Photovoltaic technology is a term used to describe the system that converts solar energy into usable power, generating electricity from sunlight. On the earth surface there is more than sufficient solar radiation to satisfy a vastly increased demand for solar power systems. On average, each square meter of land is exposed to enough sunlight to produce 1,700 kW of power every year. Photovoltaic Plants can be used to provide light and power for remote houses and villages (Local energy exchange) and to reduce purchased energy in Photovoltaic system integrated throughout the grid in a distributed utility structure, like residential home or commercial establishment. Photovoltaic is a simple, low risk technology that can be installed virtually anywhere where sunlight is available. This means that there is a huge potential for the use of roofs, facades and public buildings. Photovoltaic technology can be used as part of a building's envelop, providing protection from wind and rain or serving to shade the interior. Solar Electric Systems have a very little impact on the environment, making it one of the cleanest power generating technologies available. While they are operating, Photovoltaic systems produce no air pollution, hazardous waste or noise and they require no transportable fuel. The solar electricity market is booming, the world wide photovoltaic industry, particularly in Europe and Japan, is investing heavily in new production facilities and technologies; the current surge of activity in the solar electricity sector represent a foretaste of the massive transformation and expansion expected to occur over the coming decades.

ABB Components Supplier for Photovoltaic Market

ABB, as a manufacturer and supplier, has been working for many years to offer products and solutions to reduce the environmental impact of energy systems. In a world of ever diminishing resources and soaring energy demand, the focus of ABB research is fixed on developing efficient and sustainable ways to generate, transmit, distribute and use electrical energy. With a large experience in Automation Products, ABB is constantly searching for new ways to expand and enhance existing technologies to meet the needs of its customer. In a society where the climate change push for strengthening the use of clean energy, like wind power and sun energy, ABB represents the best supplier for OEMs, Installer & General Contractor, offering a complete products portfolio to support the development of renewable energy market. For Photovoltaic Market ABB supplies a comprehensive range of high technology products virtually for every residential, commercial and power plant application, to ensure its customer the value of a renewable source of energy. Furthermore ABB offers training seminary, technical support and customer service. Innovation, top quality and high endurance products are the key factors which have made ABB one of the most versatile Companies in the world wide market.

Profile

Photovoltaic Systems

Photovoltaic is the most recognizable solar energy technology; it is the most versatile, simplest to install and cheapest to maintain and provides a highly valued product: "electricity".

Grid-Connected System

This is the most popular type of solar Photovoltaic system; it is integrated with the electricity network and allows to sell any excess power production to the Utility.

This kind of technology can be installed on top of a roof or integrated into roofs and facades of private houses, offices and public buildings. Photovoltaic technology could be also used as a design feature by architects replacing elements in buildings envelope. Solar roof tiles or slates can replace conventional materials for instance.

Off-Grid System

Where no main electricity network is available, stand alone Photovoltaic plants could provide vital power for communities in remote areas; rural electrification means either a small solar home system covering basic electricity needs in a single household, or larger solar mini-grids which provide enough power for several homes (Local Energy Exchange).

ABB Partner for OEMs

Thanks to the wide choice of ABB products and technologies for automation, ABB can offer to OEMs the best solution to optimize their technological investments and maximize results in terms of quality, cost reduction and operating efficiency. Therefore, OEMs must be able to count on selected components that will guarantee, in the long term and in every foreseeable operating situation, reliable machines that satisfy all necessary safety requirements. ABB is the ideal partner of manufacturers and professionals, to whom it is also able to guarantee comprehensive, professional and efficient assistance all over the world, thanks to its presence in more than 100 countries. ABB offers a high quality products portfolio for Solar Market. For OEMs and Solar Tracking Systems Manufacturers ABB has the following product lines:

- PLCs
- Moulded Case Circuit Breakers
- Miniature Circuit Breakers
- Surge Protective Devices
- Terminal Blocks
- Waterproof Enclosures
- Contactors
- Relays
- Switch-disconnectors
- Switch Fuses
- Motors
- AC Drives



ABB Supplier for Installers

Installers must know how to operate with great flexibility in order to satisfy the specific needs of many different application situations. The best help to them in carrying out this task, can only come from the availability of a range of equipments and components that guarantee the highest quality and is also sufficiently extensive to give them personalized choices for every type of project. ABB offers a wide range of products for Field/Parallel Cabinets and Combiners:

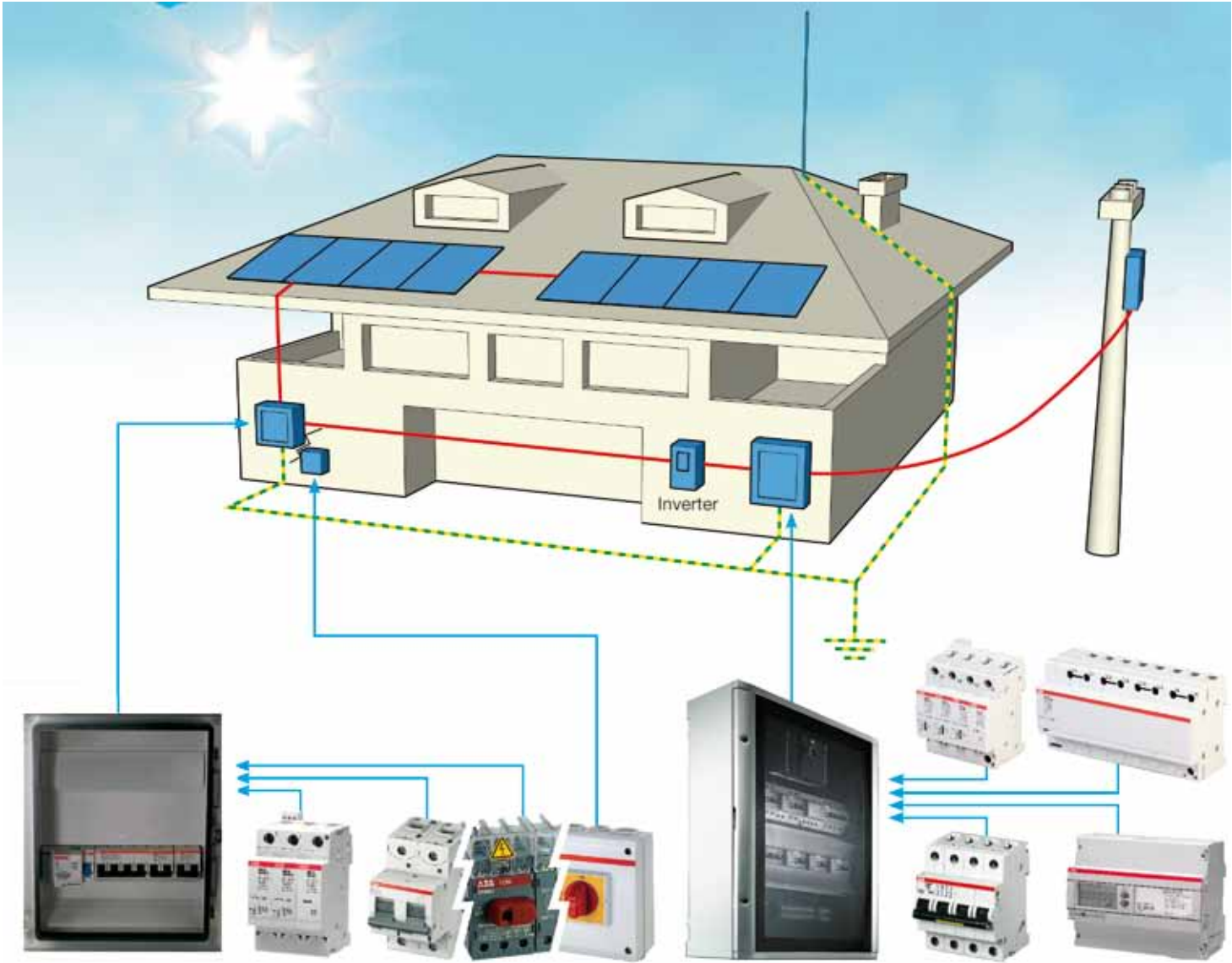
- Circuit Breakers
- Residual Current Devices
- Surge Protective Devices
- Terminal Blocks
- Waterproof Enclosures
- Meters
- Switches
- Fuse holders

In all cases,
a single solution: ABB

ABB offers broad core competence in electrical engineering and automation products. This widespread expertise is crucial to create superior and integrated solutions. For Photovoltaic market ABB offers solutions virtually for every residential, commercial and power plant application.

Applications

Photovoltaic Residential / Commercial Applications



Photovoltaic Power Plant Applications



ABB overcomes flexibility challenges for the solar industry with their PLCs, Motors and Drives. Solar power plants using solar trackers typically generate 30% more energy than fixed systems and ABB is helping by contributing intelligent automation solutions. ABB products portfolio includes all key components for operating the solar tracking systems. The function of ABB PLC is to control the ABB variable speed Drives and Motors, which orientate the Photovoltaic modules across two axes in order to achieve maximum exposure to the sun throughout the day. The PLC seeks the input from the sun and tracks its pattern along every day of the year. In case of a windy or snowy day, solar panels are placed in a safe position (vertical or flat).



Applications

Thermosolar & Thermoelectric Energy



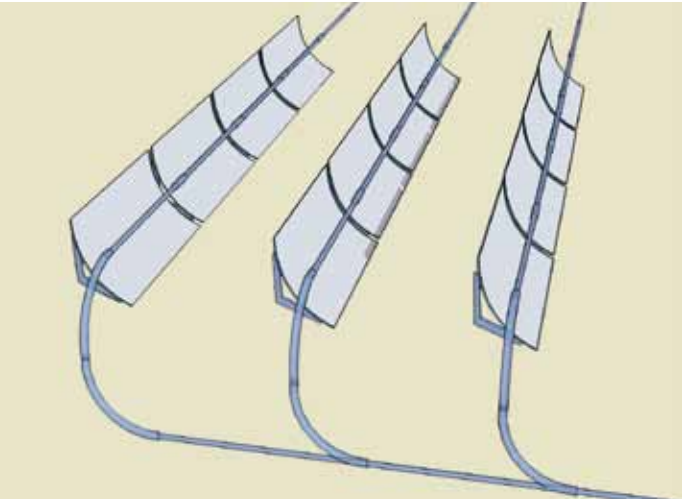
Thermosolar Energy

Thermosolar Energy is a technology for harnessing solar energy for heat (at low temperature); it is mainly used for the production of hot water in residential buildings, to heat water in swimming pools and for climatization plants and other application.



Thermoelectric Energy

Thermoelectric Energy (Solar thermal power) is a technology that uses the sun rays to heat a fluid, from which heat transfer systems may be used to produce steam. The steam, in turn, is converted into mechanical energy in a turbine and into electricity from a conventional generator coupled to the turbine.



Products

Control and Protection



Moulded Case Circuit Breakers

Tmax

AC Rated Operational Current: 32-1600 A

DC Rated Operational Current: 32-800 A

Rating Operating Voltage Ue: 1000/1150Vac¹, 1000/1150Vdc¹

Ultimate Rated Short Circuit Breaking Capacity Icu: up to 12kA (1150Vac), 20kA (1000Vac), 40kA (1000Vdc)

Temperature Range: -25° – 70°

Standards: IEC 60947-2

¹ a available for specific applications on specific frame sizes



Miniature Circuit Breakers and Switch-disconnectors

S800 PV-S, S800PV-Z

Rated Operational Current: 10A up to 125 A

Rating Operating Voltage Ue:

2 Poles up to 800V DC

3 Poles up to 1200V DC (TN-TT System)

3 Poles up to 800V DC (IT System)

4 Poles up to 1200V DC

Ultimate short-circuit breaking capacity Icu= 5 kA

Temperature Range: -25 °C up to +60 °C

Standards: IEC/EN 60947-2

S800 PV-M

Rated Operational Current: 32, 63, 125 A

Rating Operating Voltage Ue:

2 Poles 800V DC

3 Poles 1200V DC (TN-TT System)

3 Poles 800V DC (IT System)

4 Poles 1200V DC

Rated Short Time Withstand current Icw= 1,5 kA

Temperature Range

without derating: -25 °C up to +60 °C

Standards: IEC/EN 60947-3

Accessories for S800 PV

Auxiliary contact and signal/auxiliary contact

Shunt trip and undervoltage release

Rotary drive adapter and rotary handle for 3 and 4 poles

Switch disconnectors OT series

Voltage range: 750-1000V (DC side)

Standards: IEC 60947-3

Switch fuses OS series

Voltage range: 750-1000V (DC side)

Standards: IEC 60947-3

Switch disconnectors OTM Series

Voltage Range 440-500V (DC Side)

Standards: IEC 60947-3

Enclosed switches OTP series

Plastic enclosure: IP65



Moulded Case Switches

Tmax /D

Rated Operational Current: 125-1600 A

Rating Operating Voltage Ue: 1000Vac¹, 1000/1150Vdc¹

Rated Short-time current Icw: up to 20kA (690Vac)

Temperature Range: -25° – 70°

Standards: IEC 60947-3

¹ a available for specific applications on specific frame sizes

Products

Control and Protection



Surge Protective Devices

OVR PV

Protection of DC side
Inverter Un: up to 1000 V
Nominal Discharge Current: 20 kA
Maximum Discharge Current: 40 kA

OVR T1 – OVR T2

Protection of AC side



Fuse Holders

E930 series

Rated voltage: 500V AC/DC; 690V AC/DC
Rated current: up to 125A
Standards: IEC 269-2/3, IEC 947-3, EN 60269-3,
EN 60947-3

Measurement device



Electronic Energy Meters

ODINsingle

Voltage Range: 230 V
Current: 65A
Display: 6-digit LCD
Operating Temperature: -25 °C up to +55°C
Standards: IEC 62052-11, IEC 62053-21
MID Directive Compliant

DELTAplus

Voltage Range: up to 500V
Current: $\leq 80A$ (direct connection); $> 80A$ (connection through C.T.)
Display: 7-digit LCD
Operating Temperature: -40 °C up to +55°C
Standards: IEC 62052-11, IEC 62053-21
MID Directive Compliant

Serial Communications Adapters

Communication modules for Electronic energy meters

- M-bus
- Ethernet
- GSM/GPRS
- RS 232
- EIB/KNX
- LonWorks PLC

Enclosures and Terminal Blocks



Distribution and Control Boards

Gemini switchboards

Protection degree: IP66

Class of protection: II

Ue \leq 690V

Thermoplastic co-injection material 100% recyclable

GWT: 750 °C

Temperature Range: -25 °C up to +100 °C

Break proof, shock resistance: up to 20J

For indoor/outdoor use

Suited to install breakers and other DIN rail components,

MCCB, contactor and other automation product

Standards: EN 62208, EN 60439-1



Waterproof Boxes

IP44 and IP55 boxes

Temperature Range: -25 °C up to 60 °C

GWT: 650 °C up to 960 °C

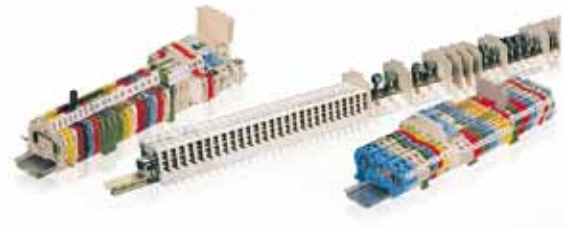
Break proof, shock resistance: up to 6J

IP65 boxes

Temperature Range: -25 °C up to 60 °C

GWT: 650 °C up to 960 °C

Break proof, shock resistance: up to 20J



Terminal Blocks

Screw terminal blocks

Voltage: max 800V AC/DC

Current: max 11,4kA

Wire size: max 95mm²

ADO System terminal blocks

Voltage: max 1000V AC/DC

Current: max 0,48kA

Wire size: max 4mm²

Spring terminal blocks

Voltage: max 800V AC/DC

Current: max 4,2kA

Wire size: max 35mm²

ADO-Screw terminal blocks

Voltage: max 1000V AC/DC

Current: max 0,48kA

Wire size: max 4mm²

ADO-ADO terminal blocks

Voltage: max 1000V AC/DC

Current: max 0,48kA

Wire size: max 4mm²

Products

Motors and Motors Control



Low Voltage Motors

General Performance Motors
Industrial Performance Motors
Aluminium, cast iron and steel motors
0,06 to 800 kW



AC500 CPU

2 serial interfaces integrated, RS232/RS485 configurable
Display and 8 function keys for diagnosis and status
Centrally expandable with up to 7 expansion modules locally
Up to 4 external communication modules simultaneously and in any desired combination
Optional: SD card for data storage and program backup
Can also be used as slave on Profibus DP, CANopen and DeviceNet via FieldBusPlug
Available with communication processors for Ethernet and ARCNET (PM5xx-ARC; PMxx-ETH)



Low Voltage AC Drives

ACS55 - Component Drives

0,18 - 2,2 kW

ACS150 - Machinery Drives

0,37 to 4 kW / 0,5 to 5 hp

ACS350 - General Machinery Drives

0,37 to 22 kW / 0,5 to 30 hp

ACSM1 - High Performance Machinery Drives

0,75 to 110 kW / 1 to 150 hp

Renewable energy



Since the beginning of the use of renewable energy, ABB has always been collaborating on the development of products and solutions that can add value to the growth of these alternative source. In the solar industry, likewise, we have wide range of protective devices and system control for solar installations, targeted at different groups of player involved in the renewable segment. ABB offer a complete products portfolio for low voltage applications and moreover, with its presence in more than 100 countries, offers technical support and service on a global basis.

Our experience in renewable energies, after technology, production capacity, quality and besides the philosophy of respect for the environment, makes ABB one of the best manufacturers for this market.

Contact us

ABB Ltd.

Automation Products Division

www.abb.com

www.abb.com/lowvoltage

www.abb.com/motors&drives